## Claims

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- 1. A process for producing a supported catalyst which comprises at least 75% by weight of Al<sub>2</sub>O<sub>3</sub>, whose proportion of Al<sub>2</sub>O<sub>3</sub> in the delta or theta modification is, based on the proportion of Al<sub>2</sub>O<sub>3</sub>, at least 1% and which comprises a rhenium compound and, if appropriate, a promoter as active component (A), which comprises
- a) converting a customary support (S) which comprises at least 75% by
  weight of Al<sub>2</sub>O<sub>3</sub> and to which a promoter may, if appropriate, have been
  applied is converted into a modified support (S) whose proportion of Al<sub>2</sub>O<sub>3</sub>
  in the delta or theta modification is, based on the proportion of Al<sub>2</sub>O<sub>3</sub>, at
  least 1% by calcining the customary support (S) at a temperature of from
  750 to 1100°C,
  - b) producing a supported catalyst precursor from the modified support (S) by applying the active component (A) comprising the rhenium compound to the modified support (S) and
- c) calcining the supported catalyst precursor at a temperature of from 500 to 750°C.
  - 2. The process according to claim 1, wherein the total proportion of Al<sub>2</sub>O<sub>3</sub> in the delta or theta modification is, based on the proportion of Al<sub>2</sub>O<sub>3</sub>, at least 10%.
  - 3. The process according to claim 1 or 2, wherein the proportion of  $Al_2O_3$  in the theta modification is, based on the proportion of  $Al_2O_3$ , at least 10%.
- The process according to any of claims 1 to 3, wherein the support (S) comprises
   Al<sub>2</sub>O<sub>3</sub> together with components selected from the group consisting of SiO<sub>2</sub>, aluminosilicates, TiO<sub>2</sub>, ZrO<sub>2</sub>, MgO, CeO<sub>2</sub> and ZnO.
  - 5. The process according to any of claims 1 to 3, wherein the amount of rhenium compound used as active component (A) in step b) is selected so that the catalyst comprises from 0.01 to 1 mmol of rhenium per gram of catalyst.
  - 6. The process according to any of claims 1 to 5, wherein the supported catalyst has an XRD spectrum in which the maximum of the most intense reflection (main reflection) is in the range from 2 theta > 66° to 2 theta < 68° and the maximum of one additional reflection or the maxima of a plurality of additional reflections (secondary reflection) are in the range from 2 theta > 32.5° to 2 theta < 37.4° and

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the intensity ratio of the respective secondary reflection to the main reflection is at least 0.05.

- 7. The process according to any of claims 1 to 6, wherein the starting materials are selected so that the total amount of alkali metal compounds, calculated as alkali metal, in the supported catalyst is less than 1000 ppm by weight.
  - 8. The process according to any of claims 1 to 7, wherein the starting compounds are selected so that the total amount of cesium compounds, calculated as elemental cesium, in the supported catalyst is less than 50 ppm by weight.
  - 9. A process for preparing a compound having a nonaromatic C-C double bond or C-C triple bond (compound A) from another compound or mixture of other compounds having a nonaromatic C-C double bond or C-C triple bond (compound B), which comprises bringing the compound (B) into contact with a supported catalyst according to any of claims 1 to 8 at a temperature of from 50 to 500°C.
- 10. The process according to claim 9, wherein compound (B) is 1-butene or a mixture of butenes comprising 1-butene.
  - 11. A supported catalyst obtainable according to claim 7 or 8.